How inflation varies across Spanish households

Henrique S. Basso
Banco de España

Ourania Dimakou
URJC

Myroslav Pidkuyko
Banco de España

EUROMOD Research Workshop 2023
Seville, Spain
September 2023

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In a Nutshell: the Paper in One Slide

Motivation, Main Message and Results

- Which parts of the population are the **most vulnerable to inflation surge?**
  - How the cost of high inflation should be shared? Workers? Corporations?
  - Prais (1959), Michael (1979), Hagemann (1982), Garner et al. (1996), Deaton (1998) and Hobijn and Lagakos (2003), Gurer and Weichenrieder (2020)

- **Our contribution:**
  - Evidence and analyse the heterogeneity of inflation from consumption across Spanish households
  - Investigate the uneven impact of the increased inflation in 2021 and 2022 and role of governmental policies

- **Main findings:**
  - Level of income is correlated to the household inflation rate
  - Between 2006 and 2020 the average difference is around 0.2pp
  - In 2021 and 2022 differences as large as over the previous 16 years together
  - Also differences across age, education, occupation, location

Methodology

- Construct household i specific inflation rate at time t

$$\pi_{it} = \sum_{j \in J} s_{ijt} \pi_{jt}$$

- s_{ijt} - **expenditure share** in good category j by household i at year t
  π_{jt} - **inflation rate** of good category j
- Expenditure data - **Household Budget Survey (EPF)** between 2006 and 2022, 2- and 4- digit COICOP/ECOICOP
- Inflation data - **National Statistics Institute (INE)**, average y-o-y inflation data, 2- and 4- digit COICOP/ECOICOP

Methodology

- How the household-specific inflation covaries with **household characteristics?**
- EPF provides data on:
  - Household income, housing tenure status, household size
  - Location - city size, population density, capital of the province
  - Age, gender, education level, occupation and type of contract of the household head
- Formally:

$$\pi_{it} = \alpha_t + \gamma_h + \beta_a age_{it} + \beta_{a2} age_{it}^2 + \beta_y y_{it} + \beta_x X_{i,t} + e_{ijt}$$

α_t and γ_h are time and region fixed effects

▸ Data Description

Household Specific Inflation from 2006 to 2022

- How the household-specific inflation covaries with **household characteristics?**

	2006 - 2022
Age	0.0049***
Age Squared	-0.000023*
Income	-0.093***
Household Size	0.018***
Retiree	0.074***
Female	-0.044***
College	-0.052***
Manager	-0.043***
Fixed-term contract	0.049***
City Size	0.027***
Renters	-0.22***
Observations	293950

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table: Inflation and Household Characteristics

▸ Inflation by Goods ▸ Breakdown by Income ▸ Breakdown by Age ▸ Shares of Expenditure

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Age	0.0049***	0.0096***	-0.016**	-0.014
Age Squared	-0.000023*	-0.000069***	0.00020***	0.00028***
Income	-0.093***	-0.053***	-0.35***	-0.62***
Household Size	0.018***	0.021***	-0.046***	0.059**
Retiree	0.074***	0.049***	-0.0091	0.0051
Female	-0.044***	-0.031***	-0.14***	-0.16***
College	-0.052***	-0.031***	-0.092***	-0.18***
Manager	-0.043***	-0.027***	-0.11***	-0.23***
Fixed-term contract	0.049***	0.039***	0.11**	0.085
City Size	0.027***	0.0046	0.16***	0.27***
Renters	-0.22***	-0.068***	-0.73***	-1.86***
Observations	293950	260495	16220	17235

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Household Specific Inflation from 2006 to 2022

Composition of the consumption baskets of distinct households implies that inflation is

- higher for relatively older and poorer households
- higher for households with more members
- lower for more educated
- lower for households who live in the bigger cities and non-homeowners
- lower for households with an indefinite contract and managerial/white-collar occupation

Inflation-income and **inflation-age** link stronger in 2021 and 2022

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Inflation-income and **inflation-age** link stronger in 2021 and 2022

What is behind those differences?

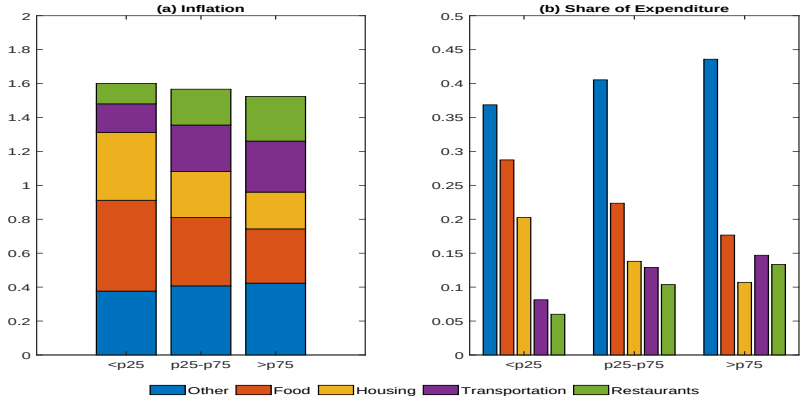
Inflation by Goods | Breakdown by Income | Breakdown by Age | Shares of Expenditure

Understanding the Differences in Inflation

Inflation and Income

2006 - 2020

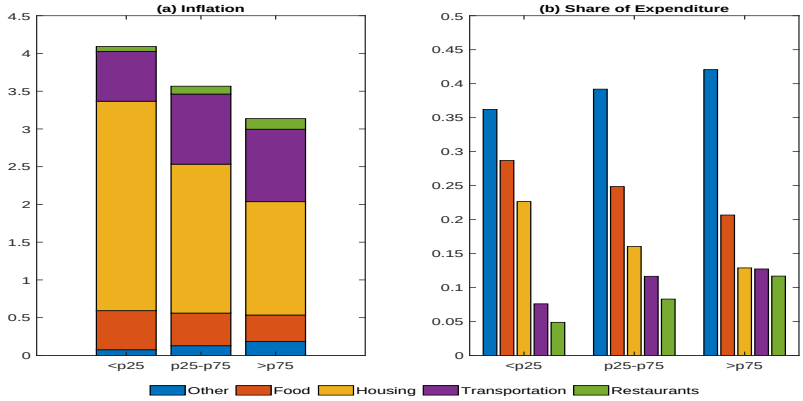
- Difference between top and bottom quartile - 0.08pp, or 1.3pp between 2006 and 2020
- Bottom quartile: relatively higher share of food and housing



Inflation and Income

2021

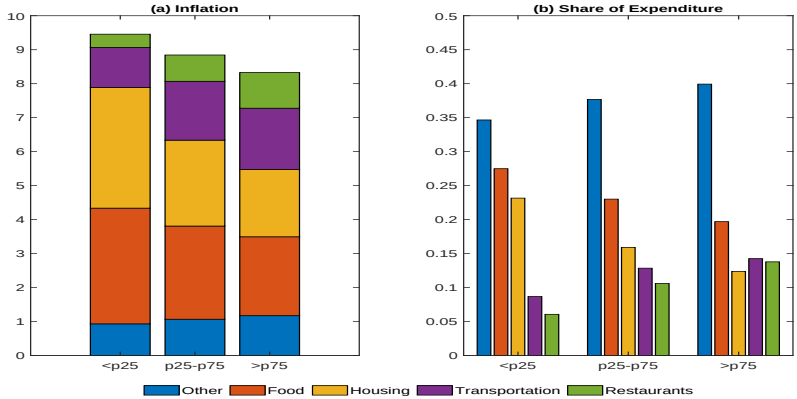
- Most differences come from increase in housing-related expenditures and transport
- Difference between top and bottom quartile - almost 1pp



Inflation and Income

2022

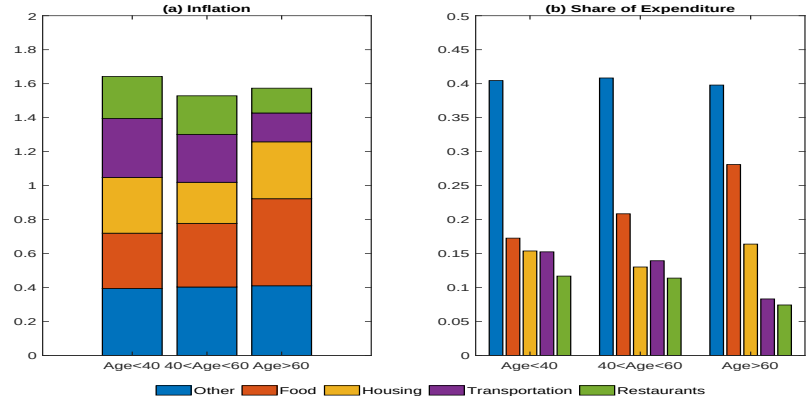
- In 2022 - housing-related inflation still high, but also food
- Difference between top and bottom quartile - more than 1pp



Inflation and Age

2006 - 2020

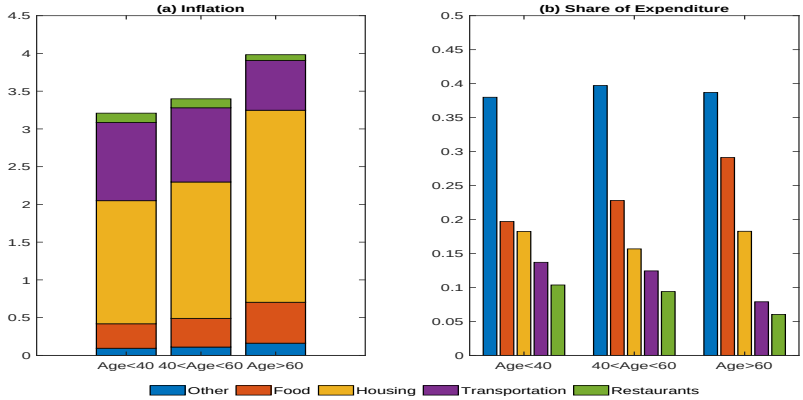
- Between 2006 and 2020 - a U-shaped relationship on age
- Younger - spend more on transportation and restaurants, older - food and housing



Inflation and Age

2021

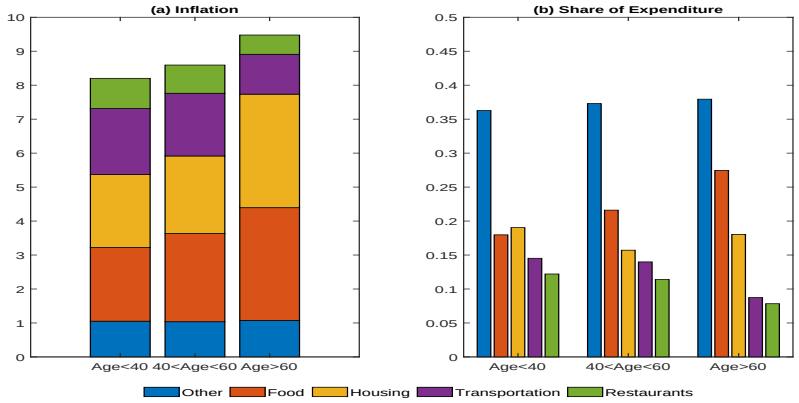
- Strong age-inflation gradient in 2021
- Increase in housing-related expenditures for older (also less likely to be renters)



Inflation and Age

2022

- Older - higher inflation on housing and food - even bigger difference, almost 1.3pp



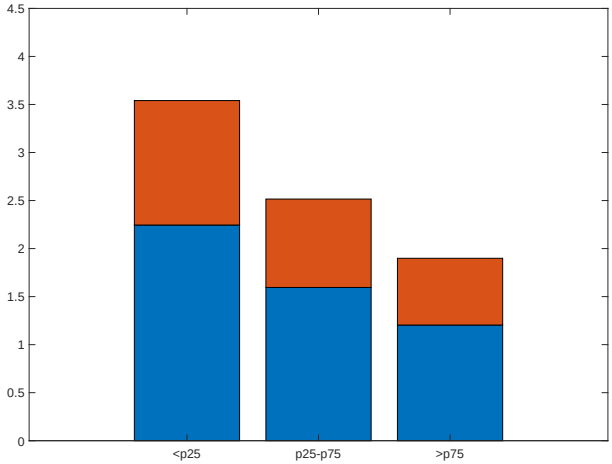
Inflation and Policy Interventions

Inflation and Policy Interventions

- In the summer of 2021, the Spanish government approved a set of measures to mitigate the increase in electricity prices, **reducing both the VAT and the excise duty**.
- In June 2022 inflation of electricity would have been **53%** instead of **33%**

Inflation and Policy Interventions

- June 2022: bottom quartile **3.5pp vs 2.2pp** (out of a total inflation of about 8.5pp for this group), top quartile **1.9pp vs 1.2pp.**
- March 2022 (peak of electricity inflation): taxes would have reduced the contribution of electricity to inflation for the poorest quartile from **9.2 to 7.2pp.**



Conclusion

- We document **inflation inequalities** across income groups, size, age, education, and gender of distinct (heads of) households.
- Inflation **decreases with households' real income**, as poorer households spend a larger share of their total expenditures on food and housing expenses.
- Everyone's inflation higher, but differences even larger in **2021 and 2022.**
- VAT tax cut on electricity in June 2021 helped all households, but they were indeed **more beneficial to the most vulnerable** who spend a greater part of their consumption on electricity.

Thank you!

Appendix

Data Description

- We define age as the age of the head of the household. Dummy variables Young and Adult are for households with the age of head below 40 and between 40 and 60 years, respectively.
- Income is defined as the logarithm of real income.
- Household size is measured as the number of members in the household.
- Retiree indicates if the household head has retired.
- Female indicates if the head of household is female.
- Variable College is an indicator variable that takes a value 1 if the head of household obtained a college degree.
- Variable Manager indicates if the occupation of the head of the household is classified as managerial or while collar.
- Temporary Contract indicates if the head of the household works under a temporary contract.
- City size takes values of 1 to 5, 1 denoting cities with more than 100000 habitants, 2 for cities with 50000 to 100000 habitants, 3 for cities with 20000 to 50000 habitants, 4 for cities with 10000 to 20000 habitants and 5 denoting cities with less than 10000 habitants.
- Renter takes a value of 1 if the tenure status of the household is renters.

Back

Household Specific Inflation from 2006 to 2022

Inflation by Goods

Table: Inflation and Household Characteristics

	Inflation Total	Inflation Food	Inflation Housing	Inflation Transportation	Inflation Restaurants
Age	0.0049***	0.0029***	-0.0049***	0.0049***	0.0011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Age Squared	-0.000023*	0.000024***	0.000080***	-0.000088***	-0.000034***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income	-0.093***	-0.13***	-0.13***	0.075***	0.074***
	(0.011)	(0.009)	(0.013)	(0.008)	(0.004)
Household Size	0.018***	0.028***	-0.027***	0.011***	-0.0073***
	(0.004)	(0.002)	(0.002)	(0.003)	(0.001)
Retiree	0.074***	0.0094	0.0090	-0.0050	0.0062
	(0.016)	(0.013)	(0.012)	(0.014)	(0.004)
Female	-0.044***	-0.0091***	0.038***	-0.064***	-0.033***
	(0.008)	(0.003)	(0.006)	(0.010)	(0.002)
College	-0.052***	-0.029***	-0.016***	0.00059	0.0079***
	(0.008)	(0.004)	(0.006)	(0.006)	(0.002)
Managers	-0.043***	-0.042***	0.00093	-0.024***	0.014***
	(0.008)	(0.005)	(0.004)	(0.005)	(0.003)
Fixed-term contract	0.049***	0.013**	0.020***	0.0073	-0.0031
	(0.012)	(0.006)	(0.008)	(0.006)	(0.002)
City Size	0.027***	0.0070***	0.0058*	0.022***	-0.0028***
	(0.007)	(0.001)	(0.003)	(0.004)	(0.001)
Renters	-0.22***	-0.099***	0.13***	-0.072***	-0.038***
	(0.038)	(0.009)	(0.022)	(0.014)	(0.004)
Observations	293950	293950	293950	293950	293950

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Household Specific Inflation from 2006 to 2022

Inflation by Income Groups

Table: Household Inflation And Income

	All Households	Households Income $<$ p25	Households p25 $<$ Income $<$ p75	Households Income $>$ p75
Age	0.0049***	0.0027	0.0045**	0.0082***
	(0.001)	(0.003)	(0.002)	(0.002)
Age Squared	-0.000023*	-0.0000060	-0.000023	-0.000042*
	(0.000)	(0.000)	(0.000)	(0.000)
Income	-0.093***	-0.12***	-0.069***	-0.065***
	(0.011)	(0.020)	(0.016)	(0.017)
Household Size	0.018***	0.036***	0.018***	0.0082*
	(0.004)	(0.007)	(0.004)	(0.004)
Retiree	0.074***	0.10***	0.072***	0.049***
	(0.016)	(0.023)	(0.019)	(0.016)
Female	-0.044***	-0.071***	-0.037***	-0.0056
	(0.008)	(0.015)	(0.010)	(0.009)
College	-0.052***	-0.11***	-0.043***	-0.042***
	(0.008)	(0.019)	(0.009)	(0.010)
Managers	-0.043***	-0.035**	-0.045***	-0.051***
	(0.008)	(0.017)	(0.009)	(0.010)
Fixed-term contract	0.049***	0.040***	0.056***	0.013
	(0.012)	(0.015)	(0.012)	(0.018)
City Size	0.027***	0.026***	0.027***	0.028***
	(0.007)	(0.008)	(0.006)	(0.007)
Renters	-0.22***	-0.30***	-0.19***	-0.13***
	(0.038)	(0.045)	(0.038)	(0.040)
Observations	293950	71377	148837	73723

Standard errors in parentheses
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Household Specific Inflation from 2006 to 2022

Inflation by Age Groups

Table: Household Inflation And Age

	2006-2022	2006-2020	2021	2022
Young (age $<$ 40)	-0.078***	-0.077***	-0.22***	-0.48***
	(0.021)	(0.022)	(0.055)	(0.091)
Adult (40 $\leqslant$ age $\leqslant$ 60)	-0.033**	-0.019	-0.20***	-0.39***
	(0.017)	(0.017)	(0.043)	(0.071)
Income	-0.093***	-0.052***	-0.36***	-0.64***
	(0.011)	(0.008)	(0.033)	(0.042)
Household Size	0.016***	0.021***	-0.046***	0.054**
	(0.004)	(0.004)	(0.012)	(0.022)
Female	-0.043***	-0.031***	-0.13***	-0.14**
	(0.008)	(0.008)	(0.025)	(0.050)
College	-0.056***	-0.034***	-0.098***	-0.20***
	(0.008)	(0.007)	(0.027)	(0.037)
Managers	-0.044***	-0.027***	-0.11***	-0.24***
	(0.008)	(0.006)	(0.028)	(0.060)
Fixed-term contract	0.045***	0.036***	0.10*	0.059
	(0.012)	(0.009)	(0.048)	(0.069)
City Size	0.027***	0.0045	0.16***	0.27***
	(0.007)	(0.005)	(0.018)	(0.031)
Renters	-0.22***	-0.073***	-0.74***	-1.88***
	(0.038)	(0.026)	(0.036)	(0.053)
Observations	293950	260495	16220	17235

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Household Specific Inflation from 2006 to 2022

Shares of Expenditure

Table: Share of Consumption and Household Characteristics

	Share of Exp. Food	Share of Exp. Housing	Share of Exp. Transportation	Share of Exp. Restaurants
Age	0.0015***	-0.00088***	0.0012***	0.00044***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Age Squared	0.0000076***	0.000016***	-0.000028***	-0.000014***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Income	-0.056***	-0.036***	0.029***	0.034***
	(0.0007)	(0.0006)	(0.0006)	(0.0004)
Household Size	0.013***	-0.0094***	0.0023***	-0.0045***
	(0.0002)	(0.0002)	(0.0003)	(0.0002)
Retiree	0.0043***	-0.0023***	-0.0013*	-0.0052***
	(0.0010)	(0.0008)	(0.0008)	(0.0006)
Female	-0.0021***	0.010***	-0.019***	-0.017***
	(0.0005)	(0.0005)	(0.0006)	(0.0005)
College	-0.013***	0.0011**	-0.000039	0.0028***
	(0.0006)	(0.0005)	(0.0007)	(0.0005)
Managers	-0.018***	0.0012***	-0.0045***	0.0071***
	(0.0006)	(0.0004)	(0.0006)	(0.0005)
Fixed-term contract	0.0058***	0.0034***	0.0024***	-0.0027***
	(0.0008)	(0.0006)	(0.0007)	(0.0005)
City Size	0.0031***	-0.0042***	0.0075***	-0.00096***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)
Renters	-0.043***	0.19***	-0.024***	-0.017***
	(0.0008)	(0.0024)	(0.0008)	(0.0007)
Observations	293950	293950	293950	293950

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